The Problems that Women face in STEM Fields and Computer Science Environments

Lucy Paul and Levi Banos

INTRODUCTION

We studied the issues that women face in STEM fields and Computer Science environments. Our group being composed of a Hispanic person and a Woman both in computer science at an engineering school, we feel that it is important to devote time to research how we can abolish the gender discrepancies within the two fields. The field as we have experienced seemed to have an unhealthy competitive nature and was dismissive of the contributions of people who were not white cisgendered men. We conducted our research to understand more about how to communicate to people who have not experienced this firsthand and to find out what we can do to make these spaces more accessible and accepting to currently underrepresented peoples. We used interviews from prominent scientists, recent demographics from various engineering schools, articles published in journals, books, and dissertations to understand the historical impact and the experiences of women and minorities. We gathered more recent and personal data points using the platforms of YouTube and TikTok to learn about the personal experiences of women to get a well rounded understanding of the ways that the current environments of STEM create gender discrepancies and make suggestions as to how they can be improved.

METHODS

For this topic we looked for primary resources would be the most beneficial to understanding the issue that women face in STEM fields and also gain deeper insight into how these issues start. We decided to use TikTok and Youtube to find videos about the topic. On Youtube we searched for topics like “what is it like to be a woman in STEM” and “experiences of women in STEM.” From this we found an abundance of TEDtalks, video blogs, and interviews of women sharing their experiences and advice.

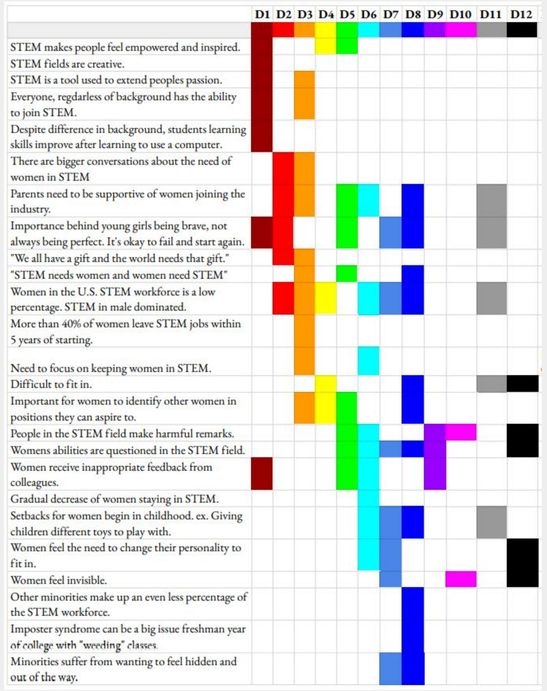
While YouTube provided a lot of insight from many perspectives, it was harder to find data from TikTok. This is because the platform is focused around short videos that get their point across quickly, whereas the topic we are analyzing is very complex and the issues can’t be discussed in a few seconds. For collecting data we searched for “women in STEM” and focused on longer videos with more dialogue. Using this method we found a few interesting videos that shared the rude comments that women receive from colleagues in STEM fields.

LITERATURE REVIEW

One of the prevalent suggestions to minimizing gender discrepancies in computer science & STEM is to not solely focus on the issue of *gender* discrepancies, but have both students and faculty better educated about how these issues of gender and race are interrelated.

There were many notable findings after conducting literature review for our project. First, we noticed a trend where critique towards the work that women make is very different from that of men. We noticed that many of these critiques are gendered and are the result of unconscious bias or misogyny. A good example would be women being perceived as caretakers within a traditional nuclear family, and doubting their ability to succeed in their careers as a result . This in turn extends to a bias against femininity as shown in studies on students in concentrations where there is no gender disparity such as biomedical engineering. In these studies, it is thought that even though there is no population disparity, male students are still seen as having more desirable academic traits and seen as smarter. Several women were reported to have had feelings of ‘not belonging’ or feeling like they are not adequate. In researching this phenomena we found this perceived exclusions has been well documented in interviews of the iconic women who worked on the ENIAC machine, the first programmable digital computer to today's students and workers. this is another example of women and their histories being removed from the culture and spaces that engineering exists in.

Meanwhile it is rarely the case that this erasure is understood as the reason for their departure from this sector, or the reason why women avoid the industry in the first place. This extends past a non-feminine environment to being an exclusively masculine one, as the non-binary experiences we learned about were similar to that of women. The same is true about members of other underrepresented communities such as racial minorities. Another important finding was that women and members of the LGBTQ+ community use avoidant conflict resolution styles when dealing with discrimination or unfair critique by hiding or ‘masque-ing’ their identities. It is suggested throughout multiple of our sources that a better understanding of intersectionality and interdisciplinary education and interaction would result in a better understanding of the experiences of others and create healthier atmospheres organically.



RESULTS

From the videos we discovered many issues we weren’t aware of before and noticed many common themes that connected the experiences of all women in STEM. Some of the major themes we found were

- Women feel invisible and like they need to change their personality to fit in
- Low percentage of Women in the STEM workforce
- Womens abilities are constantly questioned

These are just a handful of the issues and setbacks that women face in the workplace. One major pattern we saw was that oftentimes identity isn’t discussed in the workplace and this is causing minority groups to feel left out because their identities are being ignored or otherwise made to be invisible. This is more prevalent in minority groups that feel the need to “hide” or “stay out of the way.” Another big theme we noticed was that more girls are going into STEM careers, but then aren’t staying in them. A few of the videos called this the “leaky pipe” or “leaking bucket” issue. This is why about 50% of the people in STEM undergraduate degree programs are women, but women only make up about 28% of the STEM workforce. Another commonality between the videos was that women were constantly finding their abilities questioned by coworkers, colleagues, and even friends. This sometimes resulted in “imposter syndrome.” In one video a previous professor of a math class recounts the time when a student came into her office hours and mistook another student as the professor because they didn’t believe that she was the professor. Finding all of these themes and patterns helped us understand the negative aspects of this environment with more clarity.

FIGURES

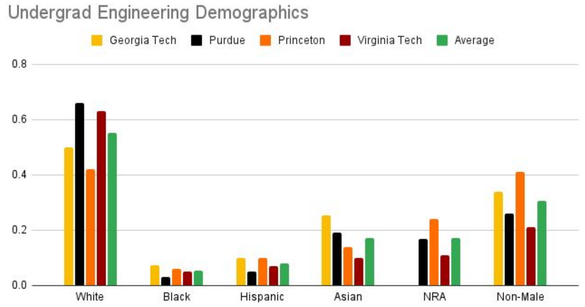


Figure 1: population demographics from prominent American engineering schools

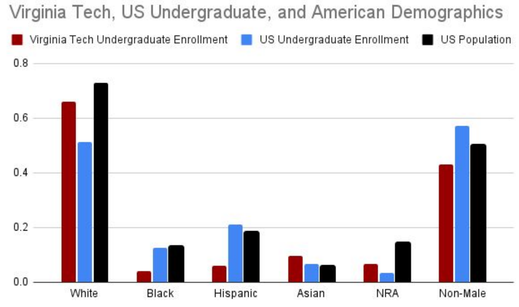


Figure 2: population demographics from Virginia Tech & US Census data

DISCUSSION

After connecting the themes in the videos and noticing new patterns we discovered some important findings. The biggest findings include:

- Young women need relatable role models to look up to
- Parents and teachers need to be supportive of women joining the industry
- It's important for young girls to be brave and bold
- Girls shouldn’t be focused on always being perfect, It's okay to fail and start again
- Women and minorities need to stop hiding their personalities to try and "fit in" with their colleagues

One issue that really stood out to us was the need to focus on keeping women in STEM. Multiple videos mentioned how women leave their STEM careers after just a few years. One possible solution that was brought up a lot was the need for relatable role models. When women have other role models it motivates them to stay in their career and keep working hard. It's especially important to find role models that have been through the same struggles. Having more role models for young girls will also make them more interested in STEM careers. Another big finding was that it’s important for young girls to have a strong support system in their parents, teachers, and friends. When their parents encourage them to follow STEM careers and their teachers help guide them on this path then there is a higher chance they will follow through with joining the STEM industry. Finally, we found that it’s important for women, and especially minorities, to stop hiding their personalities. An important piece of advice that many of the women gave was that young girls should be brave and bold. By being brave and not “hiding” or “staying out of the way” more women will want to join the STEM workforce and stay.

CONCLUSION

We found many points of data that validated our experiences and feelings towards the

I LOVE YOU

WORKS CITED